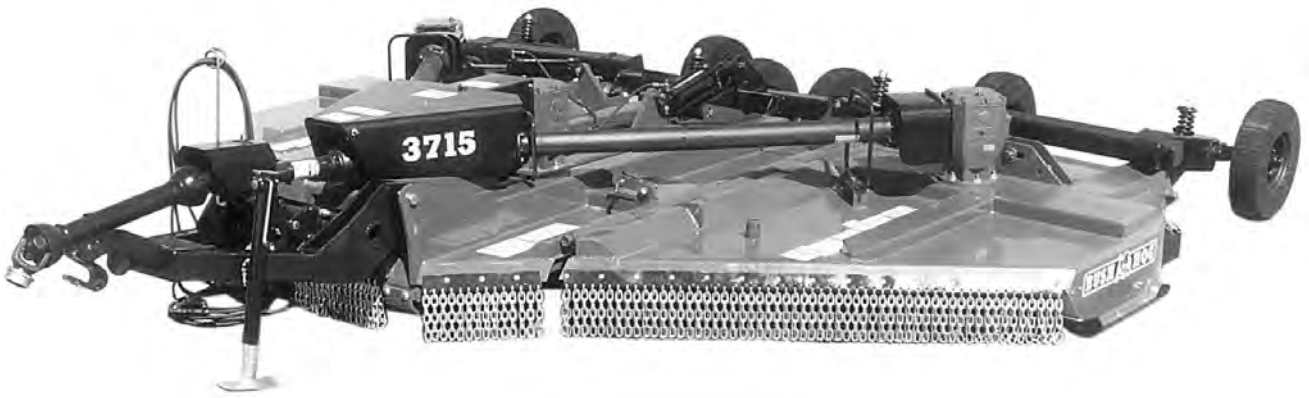
BUSH HOG®

Model 3715/3710
Flex-Wing Rotary Cutter
Operator's Manual



BUSH HOG®
Performance You Can Count On℠

OPERATION ● MAINTENANCE

06/09 Rev.1 $4.00 50029874

CONGRATULATIONS!

You have invested in the best implement of its type on the market today.

The care you give your Bush Hog implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Bush Hog will be glad to provide you with a new copy. Order from Bush Hog, 2501 Griffin Ave., Selma, Alabama 36703. Most of our manuals can also be downloaded from our website at www.bushhog.com

As an authorized Bush Hog dealer, we stock genuine Bush Hog parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Bush Hog equipment,and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED
BUSH HOG DEALER

BECAUSE BUSH HOG MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.**

3715/3710 ROTARY CUTTER

TABLE OF CONTENTS

SECTION/PARA	PAGE
Warranty	2
Dealer Preparation Check List	3
Safety Alert Symbols	4
Safety Precautions	5
Federal Laws and Regulations	6
I. INTRODUCTION & DESCRIPTION	7
1-1 Introduction	7
1-2 Description	7
II. PREPARATION FOR USE	8
2-1 Attaching To Tractor	8
2-2 Optional Valve Mounting Bracket Installation	8
2-3 Pitch Adjustment	8
2-4 Wing Adjustment	9
III. OPERATING INSTRUCTIONS	10
3-1 General Safety	10
3-2 Transporting	10
3-3 Operation	10
IV. MAINTENANCE	11
4-1 Maintenance Check List	11
4-2 Lubrication	11
4-3 Blade Replacement	13
4-4 Slip Clutch Operational Check	13
4-5 Slip Clutch Adjustment	13
4-6 Troubleshooting	13
V. ASSEMBLY	17
5-1 Model 3715 Assembly	17
5-2 Model 3710 Assembly	21
5-3 Safety Chain Installation	21
5-4 Band Installation	22
5-5 Front Belting	22
Hydraulic Diagrams	23 & 24
Safety Decals	25 & 26
Torque Specifications	27

RETAIL CUSTOMER'S RESPONSIBILITY UNDER THE BUSH HOG WARRANTY

It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.

It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's responsibility to deliver the product to the authorized Bush Hog Dealer, from whom he purchased it, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five (45) days of failure.

It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.

BUSH HOG®
Performance You Can Count On℠

LIMITED WARRANTY

★★★

DEALER PREPARATION CHECK LIST

3715 / 3710 ROTARY CUTTER

BEFORE DELIVERING MACHINE — The following check list should be completed. Use the Operator's Manual as a guide.

- ❒ 1. Assembly completed.
- ❒ 2. Gearbox filled with oil.
- ❒ 3. All fittings lubricated.
- ❒ 4. All shields in place and in good condition.
- ❒ 5. All fasteners torqued to specifications given in Torque Chart.
- ❒ 6. Slip clutches have been checked for proper operation.
- ❒ 7. All decals in place and readable. (See decal page.)
- ❒ 8. Overall condition good (i.e. paint, welds)
- ❒ 9. Operators manual has been delivered to owner and he has been instructed on the safe and proper use of the cutter.
- ❒ 10. Warranty information has been filed online with Bush Hog.
- ❒ 11. Purchaser or dealer elects to delete deflectors. (front belting, rear bands, front and rear chains)

  Explanation: _____

- ❒ 12. Purchaser or dealer elects to delete tow chain.

  Explanation: _____

WARNING

For Non-Agricultural use, OSHA, ASAE, SAE and ANSI standards require the use of Chain Guards or other protective guards at all times. Bush Hog strongly recommends the use of such guards for Agricultural uses as well, to reduce the risk of property damage, serious bodily injury or even death from objects thrown out by or from contact with the cutting blades.

Dealer's Signature _____

Purchaser's Signature _____

THIS CHECKLIST TO REMAIN IN OWNER'S MANUAL

It is the responsibility of the dealer to complete the procedures listed above before delivery of this implement to the customer.

Safety Alert Symbol

This Safety Alert Symbol means: **"ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!"**

This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in death or serious bodily injury.

Safety Signs *Signal Words*

The signal words **DANGER, WARNING, AND CAUTION** are used on the equipment safety signs. These words are intended to alert the viewer to the existence and the degree of hazard seriousness.

DANGER

White letters on **RED**

This signal word indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Black letters on **ORANGE**

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

It may also be used to alert against unsafe practices.

CAUTION

Black letters on **YELLOW**

This signal word indicates a potentially hazardous situation exist which, if not avoided, may result in minor or moderate injury.

It may also be used to alert against unsafe practices.

IMPORTANT SAFETY PRECAUTIONS

This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in serious bodily injury.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel in the operation, transport, maintenance and storage of equipment. Lack of attention to safety can result in accident, personal injury, reduction of efficiency and worst of all—loss of life. Watch for safety hazards and correct deficiencies promptly. Use the following safety precautions as a general guide to safe operations when using thismachine. Additional safety precautions are used throughout this manual for specific operating and maintenance procedures. Read this manual and review the safety precautions often until you know the limitations.

1. Read the Operator's Manual. Failure to read the Operator's Manual is considered a misuse of this equipment.
2. Become familiar with all the machine's controls and all the caution, warning and danger decals affixed to the machine before attempting to start or operate.
3. Before starting or operating the machine, make a walk around inspection and check for obvious defects such as loose mounting bolts and damaged components. Correct any deficiency before starting.
4. Do not allow children to operate the cutter. Do not allow adults to operate it without proper instruction.
5. Do not carry passengers.
6. Keep the area of operation clear of all persons, particularly small children and pets. The operator should cease mowing whenever anyone comes within the operating area.
7. Clear the work area of objects which might be picked up and thrown.
8. Use a piece of cardboard or wood rather than hands to search for hydraulic leaks. Escaping hydraulic oil under pressure can penetrate skin. If fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.
9. Do not operate without all guards and shields in place and in good condition.
10. Lower implement to ground, stop tractor engine, apply parking brake, and allow blades to completely stop before leaving the tractor.
11. Keep hands and feet away from blades.
12. This cutter is not to be operated along highways or in any area where people may be present unless all sides of the unit are enclosed by permanent bands, safety chains or other factory approved safety shields that are in good repair.
13. Wear personal protective equipment such as, but not limited to, protection for eyes, ears, feet, hands and head when operating or repairing the equipment. Do not wear loose clothing or jewelry that may catch on equipment moving parts.
14. When performing adjustments or maintenance on the cutter, first lower it to the ground or block it securely at a workable height.
15. Never stand between tractor and cutter while tractor is being backed to the cutter hitch.
16. Reduce speed when transporting cutter to avoid bouncing and momentary loss of steering.
17. Use tractor flashing warning lights, day or night, when transporting cutter on road or highways unless prohibited by law.
18. Stand clear of wing(s) when raising or lowering.
19. Purge air from hydraulic system before attempting to raise or lower wings.
20. In the event that someone other than yourself will operate this equipment we firmly suggest that all SAFETY references be discussed prior to operation.
21. It is recommended that tractor be equipped with Rollover Protective System (ROPS) enclosed cab, and a seat belt.

IMPORTANT FEDERAL LAWS AND REGULATIONS* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such).

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

This Act Seeks:
"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer—
(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.
(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations
Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

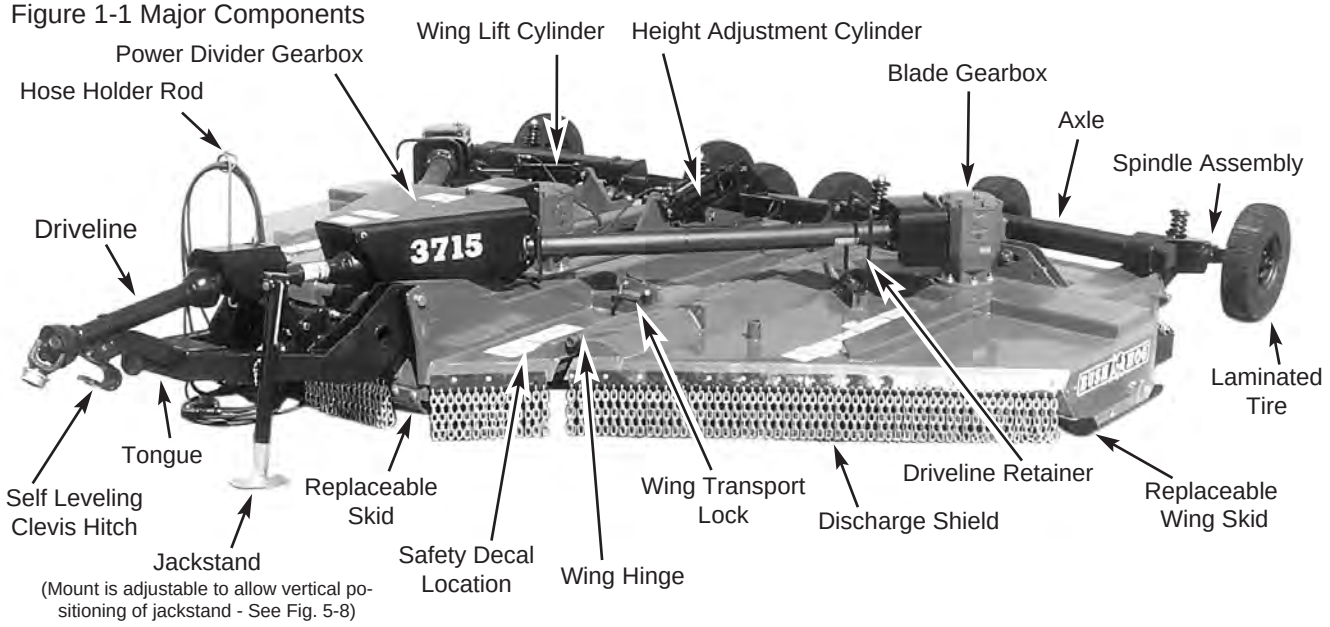
EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:

1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

Child Labor Under 16 Years Old
Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

SECTION I
INTRODUCTION AND DESCRIPTION

Figure 1-1 Major Components



1-1 INTRODUCTION

We are pleased to have you as a Bush Hog customer. Your Model 3715/3710 Flex Wing Rotary Cutter has been carefully designed to give maximum service with minimum down time. This manual is provided to give you the necessary operating and maintenance instructions for keeping your rotary cutter in top operating condition. Please read this manual thoroughly. Understand what each control is for and how to use it. Observe all safety precautions decaled on the machine and noted throughout the manual for safe operation of implement. If any assistance or additional information is needed, contact your authorized Bush Hog dealer.

NOTE

All references made in this manual to right, left, front, rear, top or bottom are as viewed facing the direction of forward travel with implement properly attached to tractor.

1-2 DESCRIPTION

The Model 3715 Rotary Cutter (Figure 1-1) consists of a center unit with two variable position wings together having a cutting width of 15 feet (4.6m). The Model 3710 Rotary Cutter consists of a center unit with one variable position wing together having a cutting width of 10 feet (3m). Wing operating angles and machine cutting height are independently controlled using hydraulic cylinders. A self-leveling linkage maintains a level cutter at all cutting heights. Power from the tractor PTO is split at the power divider gearbox and supplied to each of the blade gearboxes. Each blade gearbox has two free-swinging uplift blades designed to cut grass, corn stalks and brush. Free-swinging blades reduce the shock of impact when a stationary object is hit. Slip clutches are installed on each gearbox for additional protection. Front and rear discharge shields are included as standard equipment. **(Note: Dealer or purchaser may elect to delete at their option).** Machine specifications are given in Table 1-1

TABLE 1-1 SPECIFICATIONS

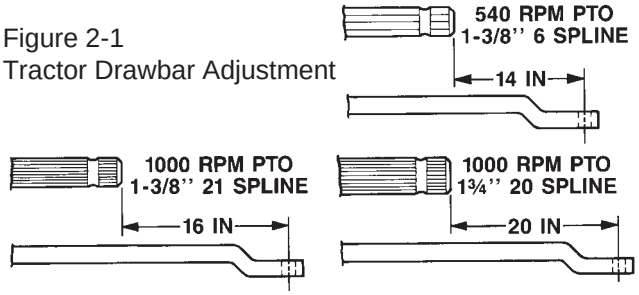
Length	188 in. (477.5 cm)
Transport Width	96 in. (243.8 cm)
Transport Height	82 in. (208.3 cm)
Working Width	186 in. (472.4 cm)
Cutting Height	2-14 in. (5.1 - 35.6 cm)
Cutting Capacity	Through 3-1/2 in. (89 mm) dia.
Blades	1/2 x 4 in. (12.7 x 101.6 mm) uplift
Blade Overlap	6 in. (15.2 cm)
Blade Tip Speed	16,289 RPM @ 540 PTO RPM 16,000 RPM @ 1000 PTO RPM
Gearbox Horsepower	Power divider 235 HP Center & Wing Gearbox 190 HP
Minimum Required Tractor Horsepower	80 HP
Wing Angles	90° up to 22° down

SECTION II
PREPARATION FOR USE

2-1 ATTACHING TO TRACTOR

A. IMPORTANT - Adjust tractor drawbar length to dimension shown in Figure 2-1. Incorrect drawbar length will change angle of driveline causing possible damage to constant velocity joint. Do not use PTO adapters. Use of PTO adapters will invalidate your warranty. See operator's manual for drawbar adjustment procedures.

Figure 2-1
Tractor Drawbar Adjustment



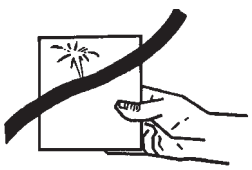
B. Raise cutter using jackstand until tongue is at drawbar height.

C. Connect cutter to tractor using 1-inch (25.4mm) diameter approved pin with lynch pin retainer or equivalent.

D. If optional valve is used, mount as desired. If optional valve mounting bracket is used with valve, attach to tractor as described in paragraph 2-2.

⚠ CAUTION

USE A PIECE OF CARDBOARD OR WOOD RATHER THAN HANDS AND WEAR EYE PROTECTION WHEN SEARCHING FOR HYDRAULIC LEAKS. ESCAPING HYDRAULIC OIL UNDER PRESSURE CAN PENETRATE SKIN. IF OIL IS INJECTED INTO SKIN, IT MUST BE SURGICALLLY REMOVED WITHIN A FEW HOURS BY A DOCTOR OR GANGRENE MAY RESULT.



E. Connect hydraulic lines to tractor auxiliary outlet(s).

F. **Unpin wing lift cylinders at rod end. Fully extend cylinders by pulling on clevis. Retract cylinders using hydraulic valve. This removes most of the air from cylinder. Repin cylinders.**

G. Attach driveline on tractor and cutter with constant velocity joint at tractor. Pull on each driveline section to be sure yokes lock into place. Make certain driveline shielding is in place and in good condition.

H. If optional pillow block driveline assembly is used, slide spacer bushing onto end of jackshaft before installing driveline. This will insure proper space will be maintained between the bearing and the driveline yoke. (Figure 5-15)

I. Attach driveline shield chains from both ends of driveline shielding to stationary location. **NOTE: The shield around the constant velocity joint should not be chained in place.**

J. Remove jackshaft and pin in storage position on deck.

2-2 OPTIONAL VALVE MOUNTING BRACKET INSTALLATION (Figure 2-2)

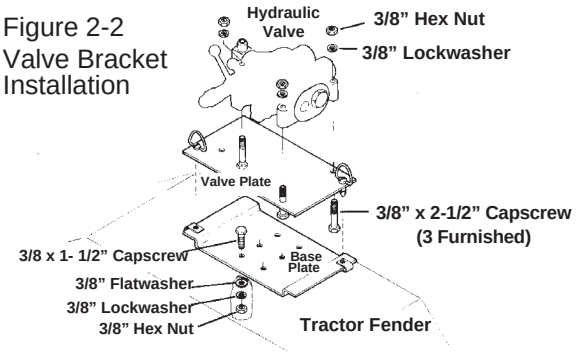
A. Place bottom bracket at desired mounting location. Mark 2-4 holes (as needed) for drilling using bracket as pattern. Drill holes using 13/32 drill bit.

B. Mount lower bracket using four 3/8 x 1-1/2" bolts, nuts, flatwashers and lockwashers.

C. Attach valve to top bracket using three 3/8" x 2-1/2" bolts, nuts and lockwashers.

D. Mount top bracket to bottom bracket using quarter turn fasteners. Insert quarter turn fastener into clip-on receptacle and turn 90 degrees.

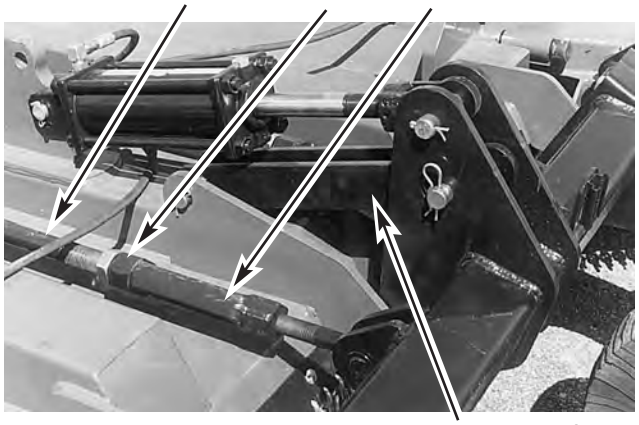
Figure 2-2
Valve Bracket
Installation



2-3 PITCH ADJUSTMENT

The pitch of the cutter (front to rear) is controlled by adjusting the linkage rods (Figure 2-3). **Shortening the linkage rod assemblies will raise the front of the cutter. Lengthening the linkage rod assemblies will lower the front of the cutte**r. The pitch adjustment is primarily for compensating for the different height of tractor drawbars. It should be noted that altering linkage rod length requires the cutting height to be reset also. As described in the following, it can also be used to alter the cutting performance. Note that operating the cutter at any pitch other than parallel to the ground will produce a slightly uneven cut.

Figure 2-3 Linkage Rod Jamnut Turnbuckle



Transport Latch

Additional mulching of cut material may be attained by operating with the rear of the cutter slightly lower than the front. This will keep foliage underneath cutter longer resulting in smaller pieces of cut material. This will increase the cutter horsepower requirements.

If you are cutting in dense material, operating cutter with the rear slightly higher than the front will allow an increased volume of cut material to exit from underneath cutter. This will decrease the cutter horsepower requirements.

Adjust the pitch as follows:

⚠ WARNING

TO AVOID SERIOUS INJURY OR DEATH: DO NOT PLACE HANDS, FEET OR OTHER PARTS OF BODY UNDER CUTTER WHILE MAKING ADJUSTMENTS. NEVER MAKE ADJUSTMENTS WITH CUTTER OPERATING.

IMPORTANT

NEVER ADJUST THE TURNBUCKLE SO THAT THE THREADED END OF ANY ROD IS NOT FULLY ENGAGED IN THE TURNBUCKLE.

A. Loosen jamnut on each linkage rod assembly. (Figure 2-3)

B. Use the turnbuckles to lengthen or shorten the leveling rod assemblies. Shortening the rods will raise the front of cutter and lengthening rods will lower the front. While adjusting, alternate from one rod to the other.

C. **When the desired pitch is attained, make a final adjustment of the rods so that each will be under the same amount of tension. This may be done by tapping the rods and "tuning" them to the same sound.**

D. Re-tighten jamnut.

NOTE

If cutter is allowed to rest on the ground in order to relieve tension on the linkage rods, tongue must be disconnected from tractor to allow it to move.

2-4 WING ADJUSTMENT

If wings are not level (parallel) from left to right with center deck section, the cutter will windrow and produce an uneven cut. Before first use and periodically thereafter, lower cutter to working position and check for this condition. If adjustment is necessary, proceed as follows:

A. Remove wing transport lock pin from locked position. Swing link out of alignment with lug on wing. Replace pin in link for storage during operation. Pin and link will "ride over" wing lug. (Figure 2-4)

⚠ WARNING

TO AVOID SERIOUS INJURY OR DEATH: STAND CLEAR OF WINGS DURING AND AFTER REMOVAL OF TRANSPORT LOCK PINS. AIR IN HYDRAULIC COMPONENTS MAY ALLOW WINGS TO FALL. DO NOT "DRIVE OUT" PIN IF IT IS TIGHT AGAINST WING LUG. TO REMOVE PIN, RETRACT WING LIFT CYLINDER TO RELIEVE LOAD ON PIN.

Figure 2-4 Transport Lock Pin In Stored Position

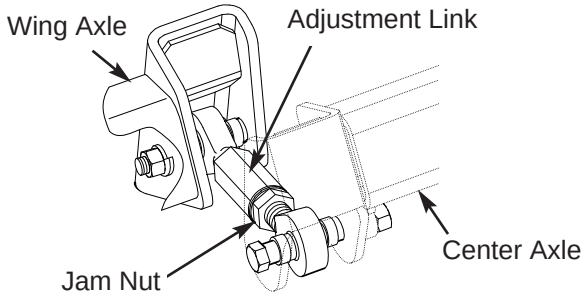
B. Lower wings to ground level allowing all weight to rest on wheels.

C. Lower cutter until skids on center section are approximately 1" - 2" off the ground.

D. If wings are not parallel to center section, loosen jam nut and adjust linkage shorter to lower wing and longer to raise wing. (Figure 2-5) It may be necessary to use wing lift cylinder to relieve pressure from linkage retaining pin.

E. Tighten jam nut to 200 ft. lbs.

Figure 2-5 Wing Parallel Adjustment



SECTION III
OPERATING INSTRUCTIONS

3-1 GENERAL SAFETY

Only qualified people should operate this machine. Operator should wear hard hat, safety glasses, and safety shoes. It is recommended that tractor be equipped with Rollover Protective System (ROPS) and a seat belt be used. Before beginning operation, clear work area of objects that may be picked up and thrown. Check for ditches, stumps, holes or other obstacles that could upset tractor or damage cutter. Always turn off tractor engine, set parking brake, and allow cutter blades to come to a complete stop before dismounting tractor.

3-2 TRANSPORTING

When implement is transported on road or highway, day or night, use tractor flashing warning lights unless prohibited by law. A slow moving vehicle (SMV) sign must be visible from the rear by approaching vehicles. A bracket for SMV sign is provided on the center section axle support. **Do not exceed 15 mph (24 kph) when traveling.** Prepare machine for transporting as follows:

A. **Disengage tractor PTO**.

B. **Raise cutter and pin transport latch to slotted holes in axle cylinder lugs. The hole at the end of the latch is for use with solid tires; the inner hole is for use with automotive or aircraft tires. (Figure 2-3)**

C. **Raise wing(s) and insert transport lock pin(s). (Figure 2-4)**

3-3 OPERATION

A. Perform BEFORE EACH USE maintenance listed in paragraph 4-1.

B. Make certain jackstand is stored for work.

C. Start tractor. Raise cutter and remove necessary stop collars from the lift cylinder not needed for working. Leave enough stop collars on cylinder to retain cylinder at desired working height. The cutter should be operated at the highest position that will give desired cutting results. this will help prevent blades from striking the ground, reducing blade wear and undue strain on the whole machine. Store unused collars on the linkage rods.

D. Remove wing lock pins and place in storage hole. (Figure 2-4)

E. Lower cutter to rest on stop collars. Lower wings to working position.

IMPORTANT

DURING OPERATION THE HYDRAULIC VALVE WING LEVERS MUST BE LOCKED IN THE FLOAT POSITION TO AVOID DAMAGE TO THE CYLINDERS AND AXLES.

When operating in areas with tall, dense material the front skids on the center section may push material over and hold it down enough to prevent blades from cutting it. This will be evidenced by streaking in the skid area. To alleviate this problem, remove the front skids.

⚠ WARNING

IT IS HAZARDOUS TO OPERATE UNIT WITH WINGS RAISED IN TRANSPORT POSITION. KEEP CLEAR OF MACHINE WHEN RAISING OR LOWERING WINGS. DO NOT "DRIVE OUT" TRANSPORT LOCK PIN IF IT IS TIGHT AGAINST WING LUG. TO REMOVE PIN, RETRACT WING LIFT CYLINDER TO RELIEVE LOADE ON TRANSPORT LOCK PIN.

F. With tractor at idle speed, engage PTO.

⚠ DANGER

STAY CLEAR OF ROTATING DRIVELINES. DO NOT OPERATE WITHOUT DRIVELINE SHIELDS IN PLACE AND IN GOOD CONDITION. FAILURE TO HEED THESE WARNINGS MAY RESULT IN PERSONAL INJURY OR DEATH.

⚠ DANGER

ROTATING CUTTER BLADES. STAND WELL CLEAR UNTIL ALL MOTION HAS STOPPED. TO AVOID AN ACCIDENTAL FALL FROM TRACTOR AND POSSIBLE INJURY BY MOWER, IT IS RECOMMENDED THAT TRACTOR BE EQUIPPED WITH ROLLOVER PROTECTIVE SYSTEM (ROPS) AND A SEAT BELT BE USED BY THE OPERATOR FOR ALL MOWING OPERATIONS.

G. Place tractor in gear and proceed forward. Advance tractor throttle to correct PTO speed for implement (540 or 1000RPM). Tractor forward speed should be controlled by gear selection, not engine speed. For maximum cutting efficiency, forward speed should allow cutter to maintain a constant, maximum blade speed. If PTO drive is disengaged due to cutter stalling or tractor engine bogging, cutter must be raised to maximum cutting height and tractor throttle reduced to idle before re-engaging. Always cut up and down the face of slopes, never across. Rear deck bands can be installed when extra shredding of foliage is desired.

⚠ WARNING

ALL ROTARY CUTTERS HAVE THE ABILITY TO DISCHARGE OBJECTS AT HIGH SPEEDS WHICH COULD RESULT IN SERIOUS INJURY TO BYSTANDERS OR PASSERS-BY.

THEREFORE, THIS CUTTER IS NOT TO BE OPERATED ALONG HIGHWAYS OR IN ANY AREA WHERE PEOPLE MAY BE PRESENT UNLESS ALL SIDES OF THE UNIT ARE ENCLOSED BY PERMANENT BANDS, SAFETY CHAINS, OR OTHER FACTORY APPROVED SAFETY SHIELDS THAT ARE IN GOOD REPAIR.

IMPORTANT

DURING OPERATION, STOP AT REGULAR INTERVALS AND CLEAN ACCUMULATED DEBRIS FROM THE TOP OF CUTTER DECK, ESPECIALLY AROUND DRIVELINES AND GEARBOXES. THIS WILL HELP PREVENT MATERIAL FROM CATCHING FIRE.

4-1 MAINTENANCE CHECK LIST

Perform scheduled maintenance as outlined below. Lower machine to ground, turn off tractor and set parking brake before doing maintenance inspections or work. Some checks may require raising machine off ground and supporting with blocks. All bolts should be torqued as recommended in Torque Chart unless otherwise indicated.

⚠ WARNING

THE CUTTER CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH, SECURELY SUPPORT CUTTER BEFORE WORKING UNDERNEATH.

BEFORE EACH USE

1. Make certain driveline shields are in place and in good repair to minimize entanglement injuries to persons by rotating drivelines.
2. Make certain deflector shields (chains, bands, etc.) are in good repair to minimize injuries to persons by the discharge of high speed thrown objects.
3. Inspect blades for wear. Replace if necessary per paragraph 4-3. **Always replace both blades on spindle with two blades equal in weight. Use only genuine Bush Hog replacement blades.**
4. Check blade bolts for tightness. **Tighten to 600 ft./lbs. (812 Nm).**
5. Check blades and spindles to be sure that no foreign objects such as wire or steel strapping bands are wrapped around them.
6. Inspect hydraulic lines and fittings for wear or leaks. Repair or replace if needed.

⚠ WARNING

USE A PIECE OF CARDBOARD OR WOOD RATHER THAN HANDS AND WEAR EYE PROTECTION WHEN SEARCHING FOR HYDRAULIC LEAKS. ESCAPING HYDRAULIC OIL UNDER PRESSURE CAN PENETRATE THE SKIN. IF OIL IS INJECTED INTO THE SKIN, IT MUST BE SURGICALLY REMOVED WITHIN A FEW HOURS BY A DOCTOR OR GANGRENE MAY RESULT.

7. Inspect wheel(s) for wear, damage or foreign objects. Repair or replace if necessary.
8. Check tractor tire air pressure. Refer to tractor operator's manual.
9. Perform BEFORE EACH USE lubrication per paragraph 4-2.
10. During operation, listen for abnormal sounds which might indicate loose parts, damaged bearings or other damage.
11. **Check tapered pin retaining each end of each driveline for tightness. Tighten nut to 30 ft./lbs. Use only genuine Bush Hog replace ment parts.**

AFTER EACH USE

1. Clean all debris from machine especially underside of deck and affixed safety decals. Replace any missing or illegible decals.
2. Inspect cutter for worn or damaged components. Repair or replace before next use. Any replacement components installed during repair shall include the components current safety decals specified by the manufacturer to be affixed to the component.
3. Store cutter in a dry place.

4-2 LUBRICATION (Figure 4-1)

NOTE

The multi-purpose grease referenced in this section is an NLGI Grade 2 type grease.

Input Driveline - Machine must be lowered to ground before lubrication so holes in shield will align.

BEFORE EACH USE

1. Driveline Universal Joints - Apply 2-3 shots of multi-purpose grease with grease gun.
2. Driveline Guard - Apply 2-3 shots of multi-purpose grease with grease gun to plastic fitting.
3. **Constant Velocity (CV) Joint - Position CV joint as straight as possible to be sure grease will penetrate to ball joint. Lubricate the central body with a minimum of 30 shots of grease every 8 hours. Lubricate telescoping members with 10 shots every 8 hours and clean telescoping members every 40 hours and completely coat with grease.**
4. Axle Pivots - Apply 2-3 shots of multi-purpose grease with grease gun.
5. Axle Arms - Apply 2-3 shots of multi-purpose .grease with grease gun. Note: Each Tandem Axle Arm has two fittings.
6. **Drivelines - Apply 8-10 shots multi-purpose grease to grease fitting accessible at end of EG drivelines or through a hole in the side of the plastic shield on Bodioli & Pavesi drivelines. (Select the appropriate driveline drawing on the following page for the locations of the various grease fittings.)**

7. **Gearboxes - Add EP80W-90 oil, if necessary, to bring oil level to check plug located on side of housing. Capacity of transfer gearbox is 2.75 quarts (2.6L). Wing and center blade gearbox capacity is 6 quarts (5.7L).**

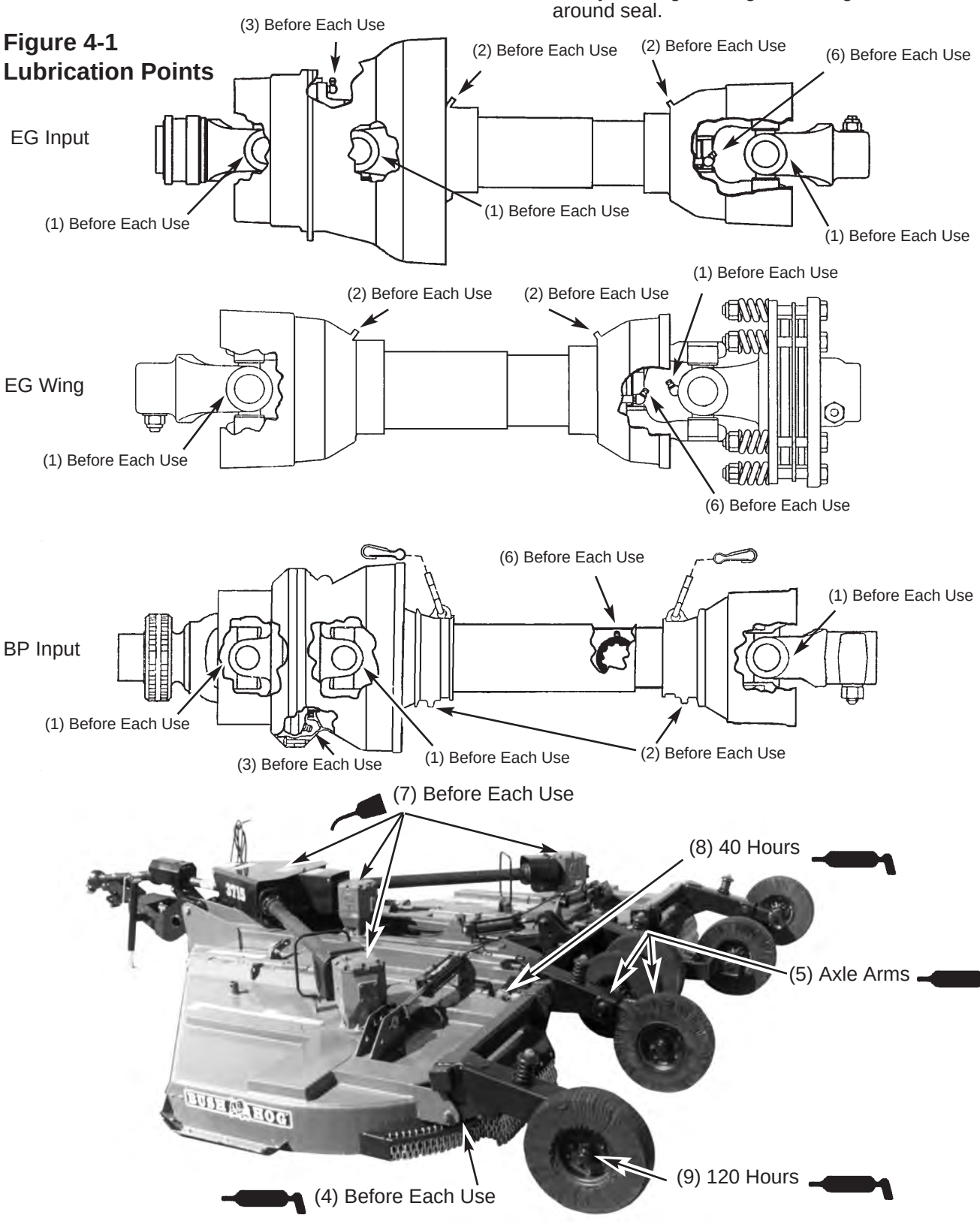
40 HOURS

8. Wing Turnbuckles - Apply multi-purpose grease slowly with grease gun.

120 HOURS

9. Wheel Bearings - Apply multi-purpose grease slowly with grease gun until grease relieves around seal.

Figure 4-1
Lubrication Points



4-3 BLADE REPLACEMENT

It is not necessary to remove the complete blade holder assembly to replace the blades.***** Blade bolts are accessible through a hole in the top of the cutter deck. **Always replace both blades on a spindle using two blades having the same weight. Use only genuine Bush Hog replacement blades.**

*NOTE:

If the round blade holder is removed from the gearbox output shaft for any reason, it must be reassembled with the slotted nut **torqued to a minimum of 450 ft. lbs.** Strike the head of the blade bolt with sledge hammer on one side and then the other. This will help seat the pan to the gearbox output shaft. Always recheck torque of the nut which holds the blade holder to the output shaft after using a sledge hammer. If 450 ft. lbs. is reached and slots in the nut do not align with the hole through the output shaft, tighten slightly more so that cotter pin may be installed. Do not "back off" on the nut to align slots with hole. Blade holder nuts should be checked periodically to ensure that they are correctly torqued.

⚠ WARNING

THE CUTTER CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH, SECURELY SUPPORT CUTTER BEFORE WORKING UNDERNEATH.

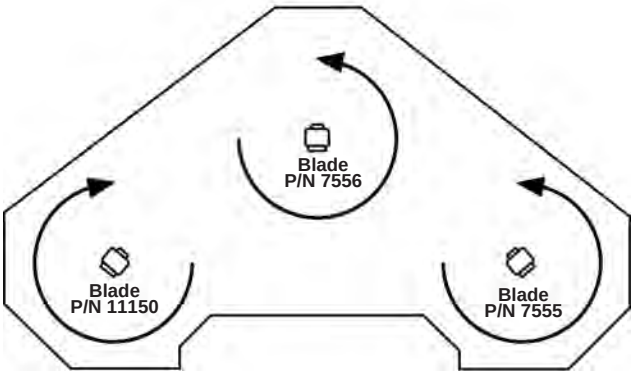
A. Remove nuts from blade bolts using 1-11/16" socket. (Available from Bush Hog - part no. 6432).

B. Inspect blade bolt shoulder for wear. Replace if necessary.

C. Assemble new blades to blade holder using blade bolts, nuts and lockwashers. **Refer to BLADE ROTATION DIAGRAM for blade placement. Tighten nuts to 600 ft./lbs. Strike blade bolt head with heavy hammer to seat, then retighten.**

D. Check to be sure blades swing 360 degrees freely. If blades will not swing freely, remove, locate problem, and repair. Operating cutter when blades will not swing freely will cause excessive vibration, damaging implement.

Figure 4-2 **BLADE ROTATION DIAGRAM**



4-4 SLIP CLUTCH OPERATIONAL CHECK

After implement has been stored for 30 days or more, perform the following operational check:

A. Lower wings to the work position. Shut down tractor.

B. Loosen eight nuts retaining clutch springs 1/3 turn or until spring can be turned with fingers.

C. With tractor at idle speed, engage tractor PTO drive for 2-3 seconds. Clutch should slip without turning blades. If clutch does not slip, contact your authorized Bush Hog dealer.

D. Retighten nuts to within 1/64" of original position. Initial spring length is 1.32" (33.6mm). Figure 4-3.

IMPORTANT

FAILURE TO RETIGHTEN NUTS TO ORIGINAL POSITION MAY CAUSE DAMAGE TO IMPLEMENT AND/OR TRACTOR DUE TO IMPROPER SLIP CLUTCH TORQUE SETTING.

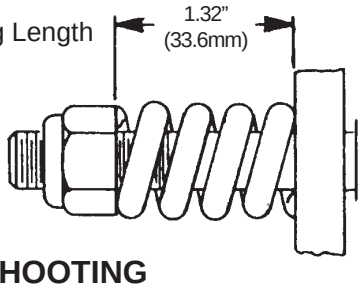
4-5 SLIP CLUTCH ADJUSTMENT

The slip clutch is factory preset to the correct torque for protecting implement and tractor. **Periodic adjustment is recommend**; refer to section 4-4. Should adjustment be needed, first check to be sure all spring lengths are the same. Initial spring lengths are 1.32" (33.6mm) shown in Figure 4-3. If necessary, adjust nut on any spring that is unequal. **Adjust all eight spring retaining nuts 1/3 of a turn (2 flats on a nut) and check clutch slippage. If further adjustment is necessary, do so in 1/3 turn increments.** Adjust only to provide sufficient torque to prevent slippage under normal conditions. Occasional slippage is normal for drivetrain protection. If satisfactory results cannot be obtained consult your Bush Hog dealer.

IMPORTANT

DO NOT OVER-TIGHTEN NUT AND CAUSE SPRING TO BECOME SOLID AS THIS WILL CAUSE SHAFT TO FAIL.

Figure 4-3 Spring Length



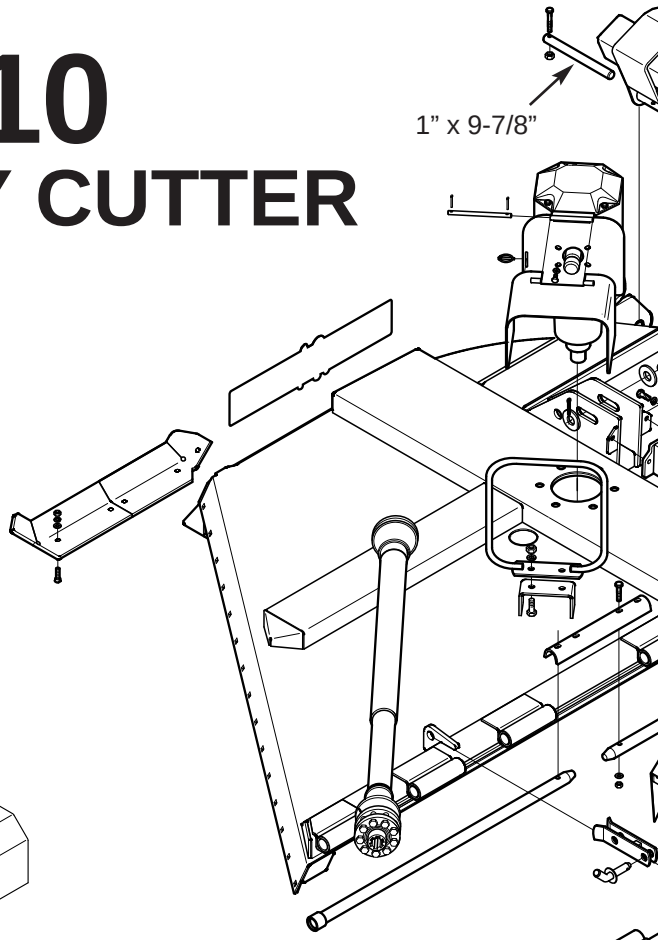
4-6 TROUBLESHOOTING

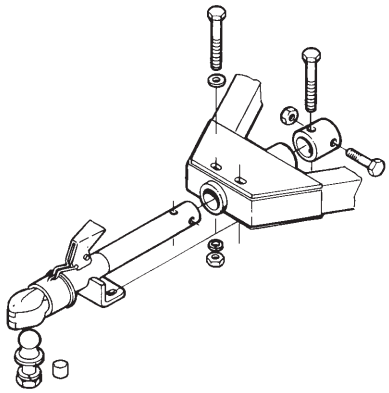
Troubleshooting procedures are listed in Table 4-1. If the problem cannot be solved or replacement parts are necessary, contact your authorized Bush Hog dealer. Please have ready your machine name, model number, serial number, purchase date and exact cause or description of problem.

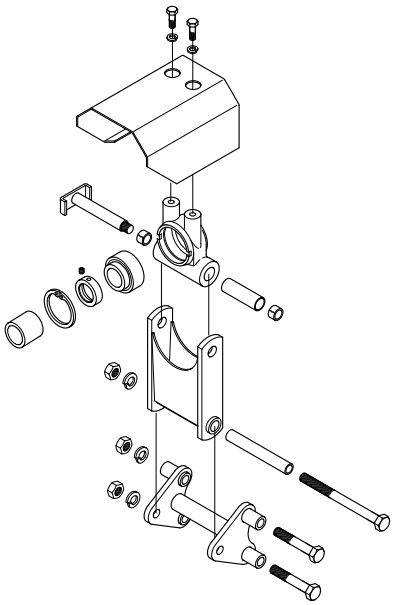
BUSH HOG®

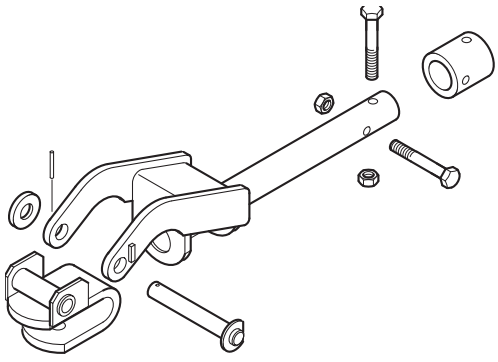
MODEL
3715 / 3710
FLEX-WING ROTARY CUTTER

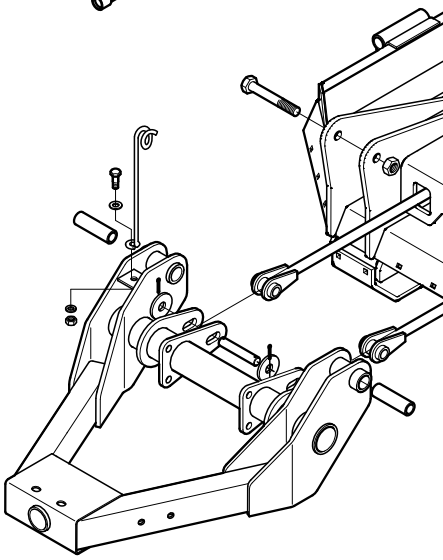
(Model 3710 Illustrated)











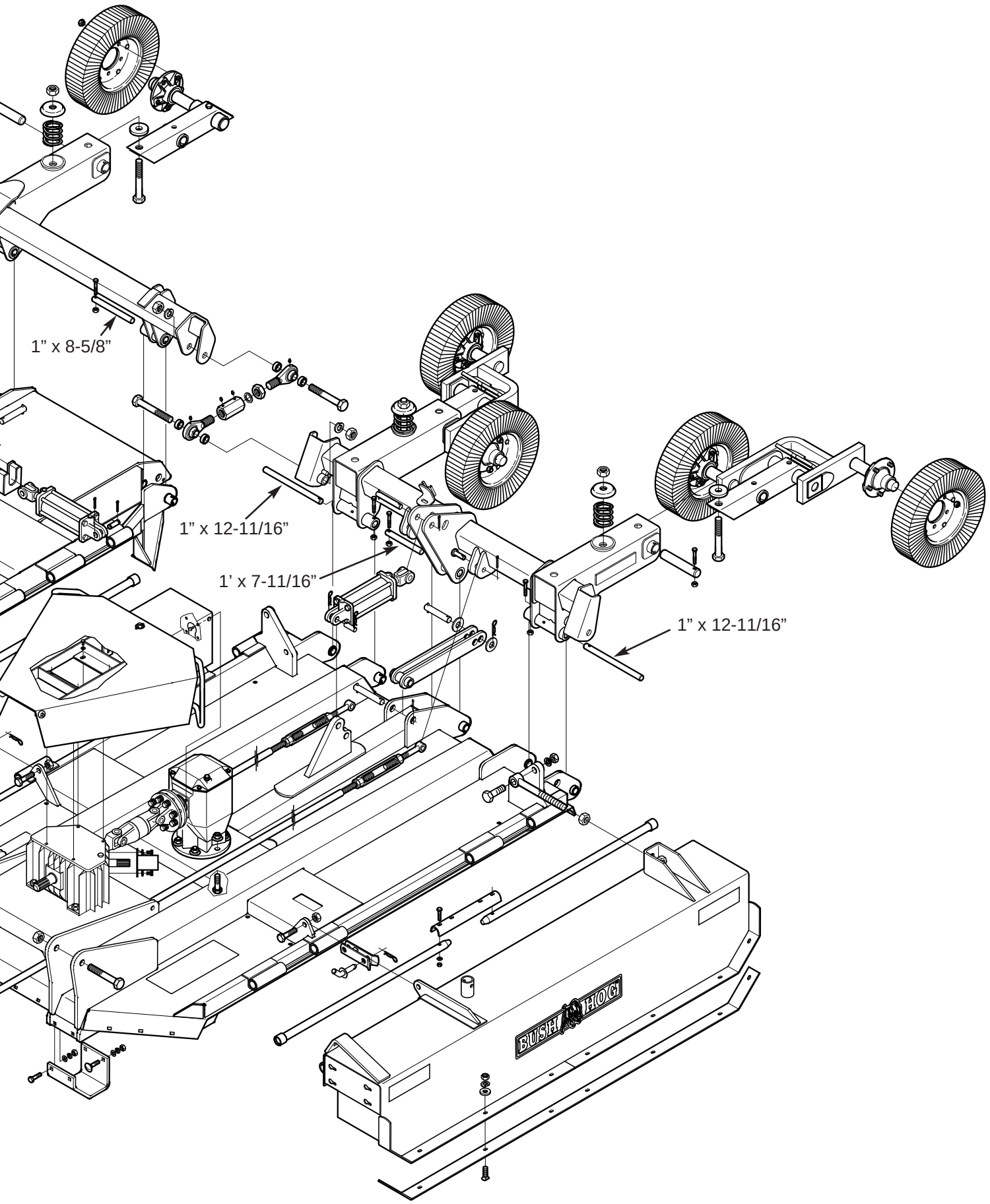

1” x 8-5/8”
1” x 12-11/16”
1’ x 7-11/16”
1” x 12-11/16”
BUSH HOG

TABLE 4-1 GENERAL TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
Uneven cut	Cutter not level side to side or front to rear.	Refer to Section II.
	Worn or bent blades.	Replace blades per paragraph 4-3.
Stripping or windrowing	Possible build up of material under cutter.	Clean cutter.
	Cutter not level.	Refer to SECTION II.
	Worn blades.	Replace per paragraph 4-3.
	Cutter not being operated at rated RPM speed.	Set tractor throttle for proper PTO speed during operation.
	Front skids holding tall material down.	Remove front skids.
Noisy cutter	Loose components.	Check all bolts for tightness.
	Low oil in gearboxes.	Check for proper oil level. Refer to paragraph 4-2.
Rapid blade wear (cutting edge)	Blade contacting the ground.	Adjust cutter to operate at a height that will eliminate ground contact.
Rapid blade wear (bolt hole)	Cutter not being operated at rated RPM speed.	Set tractor throttle for proper PTO speed during operation.
Cutter vibration	Cutter not being operated at rated RPM speed.	Set tractor throttle for proper PTO speed during operation.
	Blades on same spindle have unequal weight.	Replace blades with matched set.
Wings will not raise	Valve plumbed wrong.	Plumb as shown in Figure 5-11. Reverse hoses to tractor auxiliary hydraulic outlets.
Wing driveline shield wear or damage	Excess debris accumulation	Clean debris from cutter
	No grease	Lubricate shields per paragraph 4-2.

SECTION V
ASSEMBLY

CAUTION

THE FOLLOWING SAFETY PRECAUTIONS SHOULD BE THOROUGHLY UNDERSTOOD BEFORE ATTEMPTING MACHINE ASSEMBLY.

1. Wear personal protective equipment such as, but not limited to protection for eyes, ears, feet, hands, lungs and head when assembling the equipment. Do not wear loose clothing or jewelry that may catch on equipment moving parts.
2. Do not lift heavy parts or assemblies. Use crane, jack, tackle, fork trucks or other mechanical devices.
3. Select an area for assembly that is clean and free of any debris which might cause persons working on the assembly to trip.
4. Arrange parts to be assembled neatly in the work area and have tools or other mechanical assisting devices in easy reach.
5. Inspect all parts and assemblies thoroughly and remove any sharp edges, grease, oil or dirt which might cause pieces to slip when handling.
6. Preview the assembly instructions in your operator's manual before proceeding further.
7. If the assembly instructions call for parts or assemblies to be blocked up, use only blocking material that is in good condition and is capable of handling the weight of the assembly to be blocked. Also, insure that the blocking material is on a clean, dry surface.
8. Never put hands or any other part of body under blocked up assemblies if at all possible.
9. Always wear goggles or safety glasses when hammering, grinding, or drilling metal parts.
10. If the assembly calls for welding or cutting, be sure that there are no flammable materials close at hand and that bystanders have taken necessary precautions.

AFTER COMPLETING ANY ASSEMBLY STEP, THOROUGHLY READ THE NEXT STEP IN THE ASSEMBLY INSTRUCTIONS BEFORE PROCEEDING WITH THAT STEP.

11. After completing assembly, thoroughly inspect the machine to be sure that all nuts, bolts, hydraulic fittings or any other fastened assemblies have been thoroughly tightened.
12. After completing assembly, be sure that all safety locking devices or guards are in place.
13. Before operating the machine, thoroughly read the operation section of this manual.
14. Before operating the machine, read the maintenance section of this manual to be sure that any parts requiring lubrication such as gearboxes are full to avoid any possible damage.

BEFORE OPERATING THE EQUIPMENT, IF YOU HAVE ANY QUESTIONS REGARDING THE PROPER ASSEMBLY OR OPERATION, CONTACT YOUR AUTHORIZED BUSH HOG DEALER OR REPRESENTATIVE.

5-1 MODEL 3715 ASSEMBLY

NOTE

Overall machine assembly illustration is located on pages 14-15.

A. Four types of wheels are available for this machine, requiring the hydraulic cylinder to be mounted in different locations on the deck. Determine type of wheels by comparing to Figure 5-1. Now determine how the cylinder is to be mounted by looking at Figure 5-2. This is to compensate for the difference in wheel height.

NOTE

When using laminated tires or airplane tires, the flat side of the lug nut should be against the rim. When using automotive rims, the tapered side of the lug nut should be against the rim.

Figure 5-1 Types of Wheels
(Airplane Tires Not Shown)

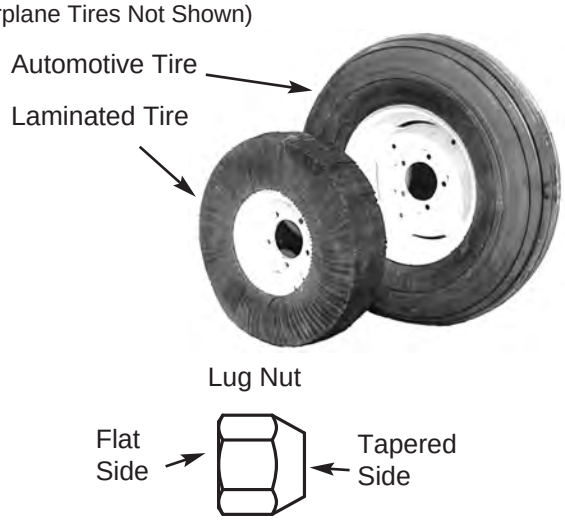
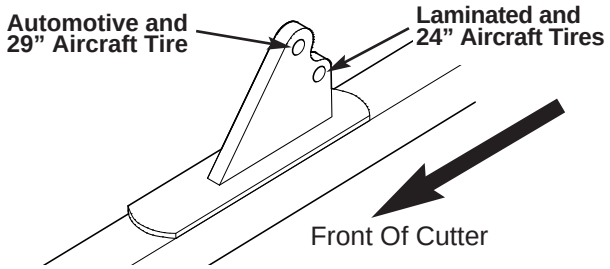
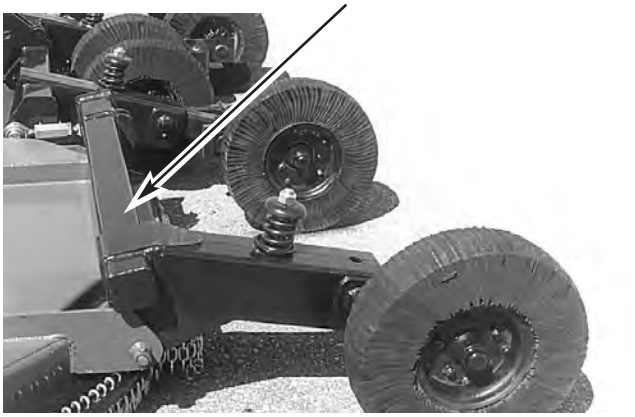


Figure 5-2 Axle Cylinder Mounting Holes



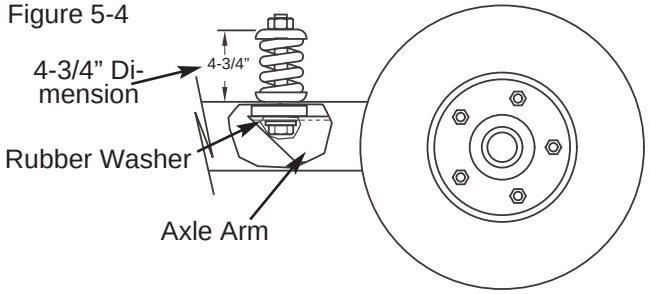
B. Pin axles onto wings and center deck using pivot pins and 3/8 x 2" bolts with locknuts. (Pages 14 & 15)

Figure 5-3 Wing Axle Assembly



C. Install axle arm to axle arm mounting bracket using one rubber washer, spring retainers, 1" x 7-1/2" bolt and 1" flanged locknut. Install pivot pin through axle mounting bracket and axle arm. Secure with 3/8 x 2-1/2" capscrew and locknut. **Tighten 1" flanged locknut until outside dimension between spring retainers is 4-3/4".** (Figure 5-4)

Figure 5-4



D. Bolt tongue to center section using two 1" x 7-1/2" bolts, locknuts and bushings. Fasten adjustable jackstand mount to tongue as shown in Figure 5-8, using 5/8 x 5" bolts, flatwasher, lockwashers and hex nuts, with slot positioned to the rear to insure stability during storage.

E. Fasten linkage rods to slots as noted in Figure 5-5 using 1" x 5-3/8" pins and 3/16 x 2" cotter pins with flat washers.

F. Attach turnbuckle end of linkage rods to axle using pins and cotter pins. Also install transport latch as shown. (Figure 5-6)

Figure 5-5

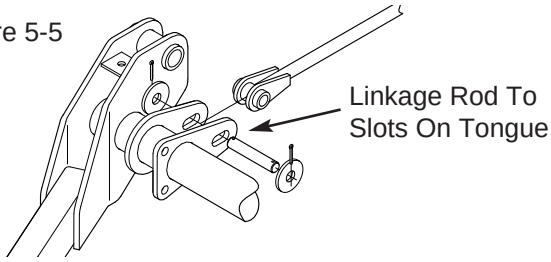
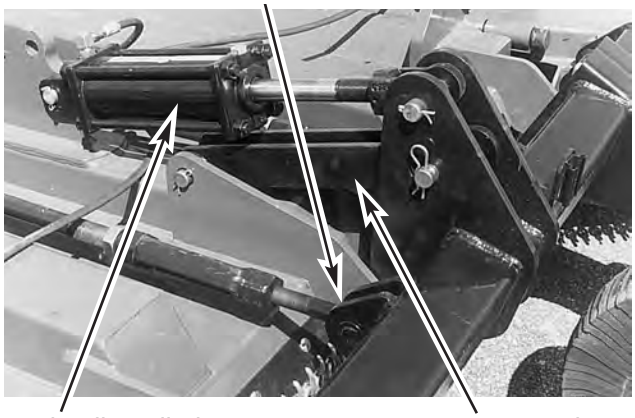


Figure 5-6 Linkage Rod Turnbuckle End To Axle



G. There are two types of hitches available for the Model 3715, a 2" ball hitch or a heavy duty, self-leveling clevis.

2" Ball Hitch - Install ball hitch weldment into tongue. Install 5/8" x 6" bolts through "L" bracket on ball hitch weldment and tongue top and bottom plates, securing with flatwashers, lockwashers and nuts. Install clevis pin collar over end of pin and secure with 5/8" x 3-3/4" bolts and locknuts. (Figure 5-7).

Heavy Duty Clevis - Remove collar from clevis pin and slide pin into tongue with the short lip of the clevis to the bottom. Replace the collar onto the back of the pin and secure with the hardware provided. Install stop pad to prevent excessive rotation using 3/4 x 6-1/2" bolts, flatwashers , lockwashers and hex nuts. (Figure 5-8)

Figure 5-7

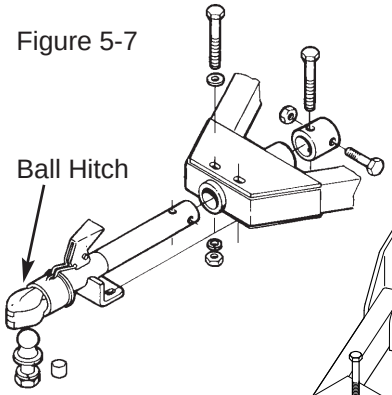
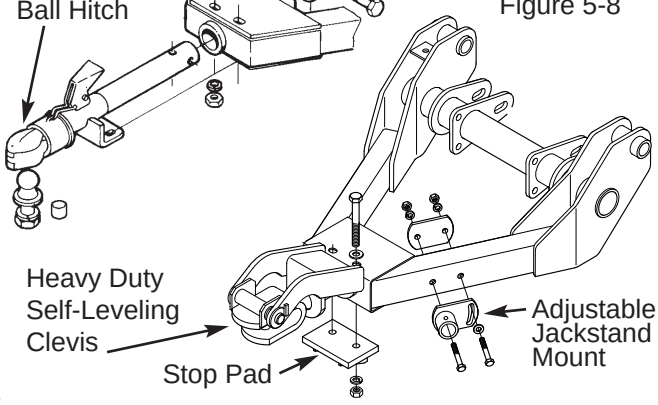


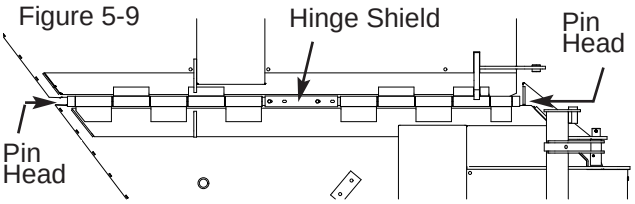
Figure 5-8



H. Connect height adjusting cylinder from cutter deck to axle. Secure the cylinder to the axle using 5-1/8" pin with roll pin and cotter pin. (Figure 5-5)

I. Attach hose holder rod to tongue using 5/8" x 2" bolt, nut, flatwasher and lockwasher. Flatwasher is installed on top and lockwasher on bottom.

J. Lift wing using a chain hoist or fork lift and position wing forward of center section with hinges aligned. Install hinge pins through hinges, **installing hinge shield between hinges as pins are inserted. Secure hinge pins to shield with 3/8 x 2" bolt, flatwasher and locknuts. Repeat this step with other wing.** (Figure 5-9)



K. Place a 2-4 inch block under each center section front skid. Raise rear of center section until it is level and install stop collars on height adjustment cylinder to retain in this position.

L. Raise wing until it is level right to left with the center section. Install adjustable link between center axle and wing axle. (Figure 5-10) **IMPORTANT: REFER TO PAGE 28 IN THIS MANUAL FOR DETAILED INSTRUCTIONS FOR INSTALLING THIS ADJUSTMENT LINK.** Adjust link as necessary to retain wing level. Repeat this step for opposite wing.

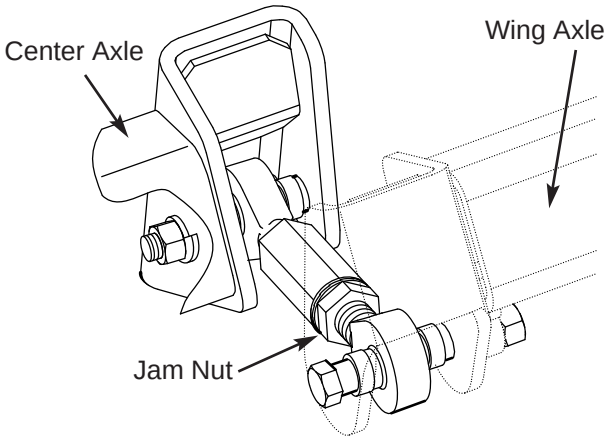
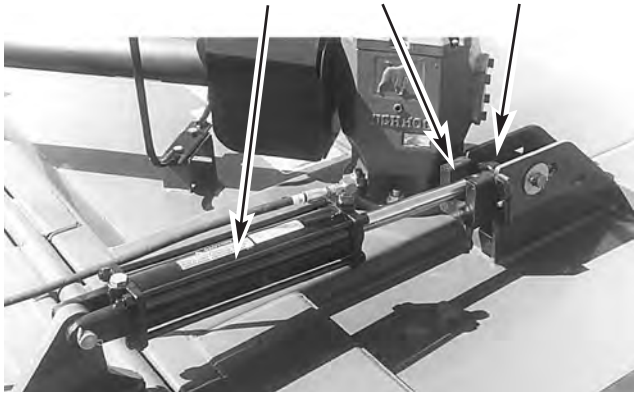


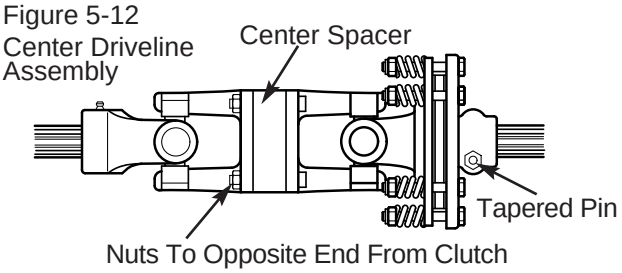
Figure 5-10 Wing Axle Adjustment Link

M. Install wing over center stops on each wing lug using 3/8 x 1" bolts and lock washers. Install wing lift cylinders with rod end connected to the wing lug. It may be necessary to remove port plugs to extend cylinder. **Install the cylinder in the slotted holes.** Secure cylinder in slot with 5-1/8" pin with roll pin, flatwashers and cotter pin. **NOTE: A flatwasher is required on both ends of the pin between the roll pin or cotter pin and the slotted cylinder lugs. If this is not done, the pin can work free of the cylinder lug. (Figure 5-11).**

Figure 5-11 Wing Cylinder Stop Wing Lugs

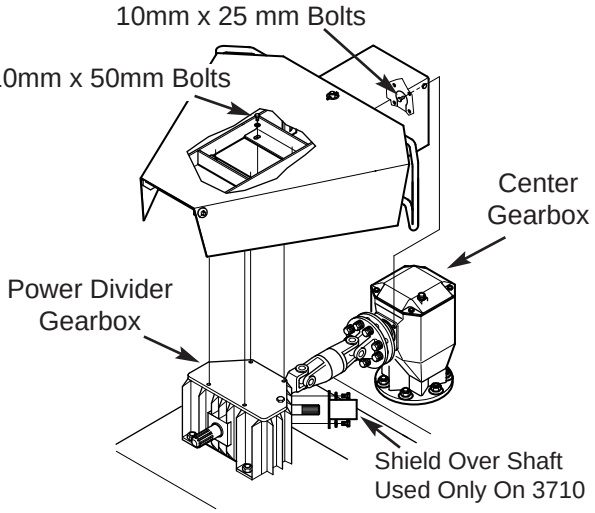


N. Assemble center section driveline as shown in Figure 5-12. Center spacer must be removed to install driveline. Install clutch end to center gearbox using tapered pin, lockwasher and nut. **Tighten to 30 ft./lbs.** Slide yoke end onto power divider gearbox. Reinstall center spacer using fasteners previously removed. Note that bolts must be installed so that nuts will be on opposite end of clutch. **Tighten to 109 ft./lbs.**



O. Attach shield assembly to center gearbox using four 10mm x 25mm bolts, lockwashers and flatwashers. (Figure 5-13) Remove four bolts from power divider gearbox. Attach shield assembly to top of power divider gearbox using four 10mm x 50mm bolts (from bag of fasteners) lockwashers and flatwashers.

Figure 5-13 Center Shield Installation

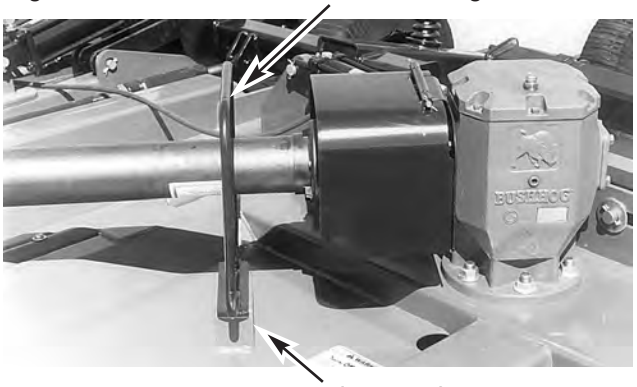


P. Attach driveline retainer ring to the mounting bracket welded to the deck of each wing in front of the gearbox input shaft. Secure with two 1/2" x 1-1/2" bolts, lockwashers and hex nuts. (Figure 5-14)

Q. Install hinge plate on wing gearboxes using four 10mm x 25mm bolts, flatwashers and lockwashers per shield. Install shield on hinge plate using 1/8 x 3/4" cotter pins. Lower shield and secure with lynch pin.

R. Install wing drivelines, attaching clutches to center transfer gearbox. Secure drivelines with tapered pin, lockwasher and nut. **Tighten nut to 30 ft./lbs.** Pull on each driveline section to make certain it is securely attached.

Figure 5-14 Driveline Retainer Ring



Mounting Bracket

S. If optional pillow block driveline assembly is used, place mount weldment between tongue plates and fasten with 3/4 x 4" bolts, lockwashers and nuts. Install spacer between lugs of mount, insert pivot spacer tube, and fasten with 3/4 x 9-1/2" bolt, lockwasher and locknut. Slide bearing onto jackshaft until it is against shoulder of shaft. Slide lock collar up to bearing and turn in the direction of shaft rotation until it slips over the inner ring extension. (Figure 5-16) Turn collar quickly in the direction of shaft rotation (approx. 1/4 turn) to tighten.

T. Align pillow block bearing housing between lugs on spacer link and fasten with pin weldment, lockwasher and nut. (Figure 5-15)

U. Place punch in blind hole in collar. Strike punch sharply with hammer in the direction of shaft rotation to tighten against inner ring extension. (Figure 5-17) **Tighten setscrew to 20 ft./lbs.**

V. Position shield over bearing housing and fasten with 1/2 x 1-1/4" capscrews and lockwashers.

W. Slide spacer bushing onto end of jackshaft before installing driveline. This will insure proper space will be maintained between the bearing and the driveline yoke.

X. Plumb hydraulic cylinders as shown in diagrams on pages 24 and 25. **Plugs are supplied to adapt valve for either an open or closed center tractor hydraulic system. Consult your tractor dealer to determine which type system your tractor has.**

Figure 5-15

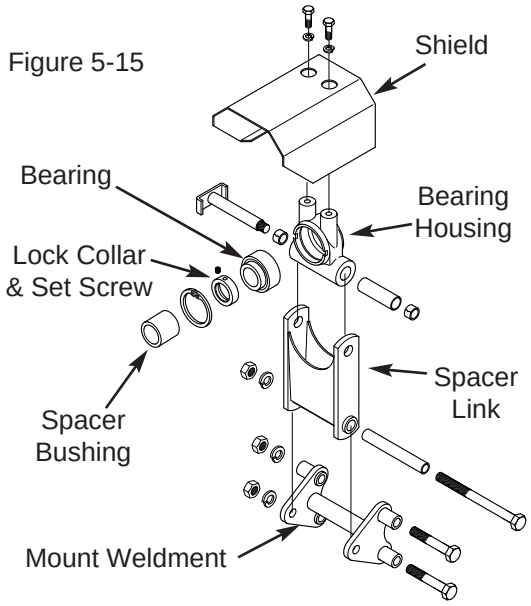


Figure 5-16

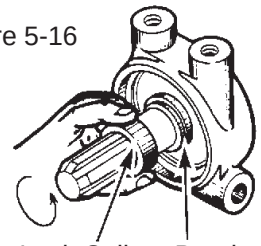
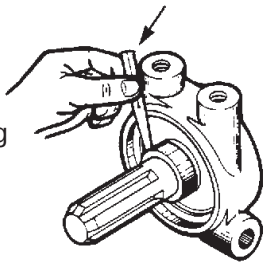


Figure 5-17 Punch



IMPORTANT

FAILURE TO MATCH VALVE TO TRACTOR HYDRAULIC SYSTEM BY USING INCORRECT PLUG WILL CAUSE DAMAGE TO TRACTOR.

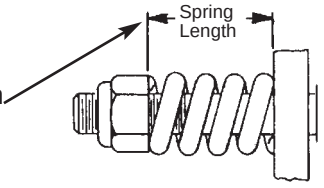
AA. **Fill each blade gearbox with 6 quarts (5.7L) of EP80W-90 gearbox oil (Transfer gearbox has 2.75 quarts (2.6L) oil capacity). Allow time for oil to seep through bearings into lower housing. Replace temporary plugs with permanent plugs supplied in owner's manual package.**

BB. On each clutch, loosen eight nuts retaining clutch springs 1/3 turn or until spring can be turned with fingers.

CC. **With tractor at idle speed, engage tractor PTO drive 2-3 seconds. Each clutch should slip without turning blades.**

DD. **Retighten nuts to within 1/64" of original position. Initial spring length is 1.32" (33.6mm).** (Figure 5-18)

Figure 5-18 SlipClutch Spring Length 1.32" (33.6mm)



IMPORTANT

FAILURE TO RETIGHTEN NUTS TO ORIGINAL POSITION MAY CAUSE DAMAGE TO IMPLEMENT AND/OR TRACTOR DUE TO IMPROPER SLIP CLUTCH TORQUE SETTING.

EE. Fold wings into the transport position and install transport lock pins.

5-2 MODEL 3710 ASSEMBLY

NOTE

Overall machine assembly illustration is located on pages 14-15.

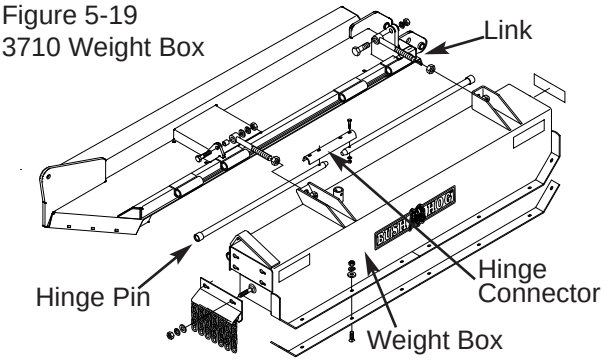
A. Perform steps “A” through “K” in paragraph 5-1.

B. Lift weight box using fork lift or chain hoist and position it forward of center section with hinge aligned. Install hinge pin through hinges and install hinge connector between hinge pins.

C. Install links from center section to weight box as shown in Figure 5-19.

D. Perform steps “L” through “Z” in paragraph 5-1.

Figure 5-19
3710 Weight Box



5-3 SAFETY CHAIN INSTALLATION

⚠ WARNING

FOR NON-AGRICULTURAL USE, OSHA, ASAE, SAE AND ANSI STANDARDS REQUIRE THE USE OF CHAIN GUARDS OR OTHER PROTECTIVE GUARDS AT ALL TIMES. BUSH HOG STRONGLY RECOMMENDS THE USE OF SUCH GUARDS FOR AGRICULTURAL USES AS WELL, TO REDUCE THE RISK OF PROPERTY DAMAGE, SERIOUS BODILY INJURY, OR EVEN DEATH FROM OBJECTS THROWN OUT BY OR FROM CONTACT WITH THE CUTTING BLADES.

A. Compare each chain assembly to Figure 5-20 to determine location for installation.

B. Align holes in chain assembly with those on cutter. Insert 3/8 x 1-1/2” carriage bolts through chain assembly and deck. Secure with flatwashers, lockwashers and nuts.

C. Tighten all nuts.

SAFETY TOW CHAIN

A. Securely attach tow chain to cutter by looping hook end of chain around one side member of tongue and back through large link on opposite end of chain.

B. Before use, attach loose end of chain to towing vehicle attaching point such as drawbar or bumper, etc. Fasten chain back to itself with hook latch.

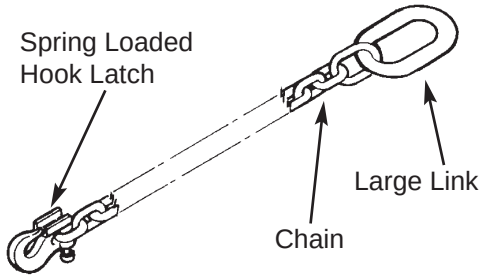


Figure 5-20
Safety Chain Locations

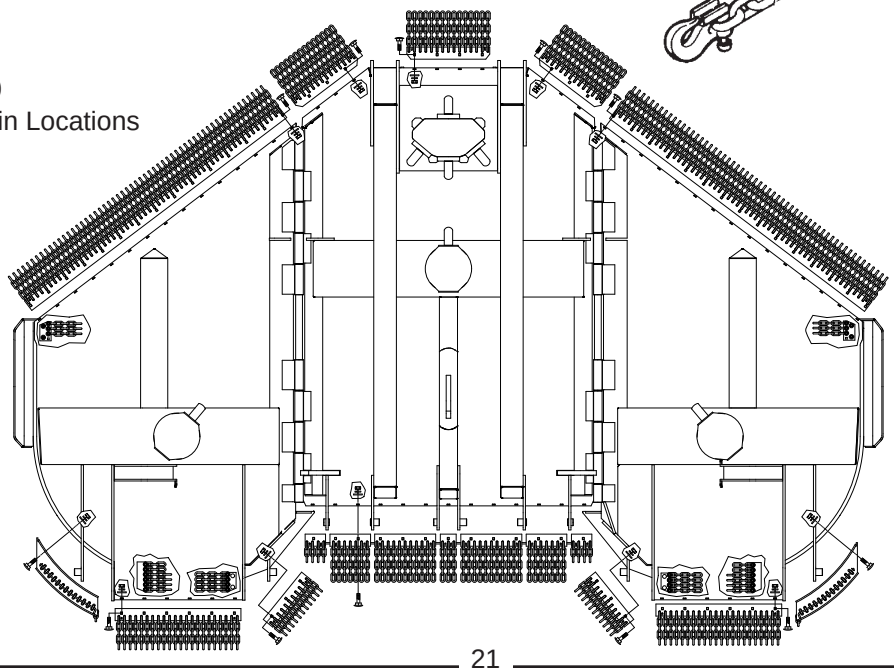
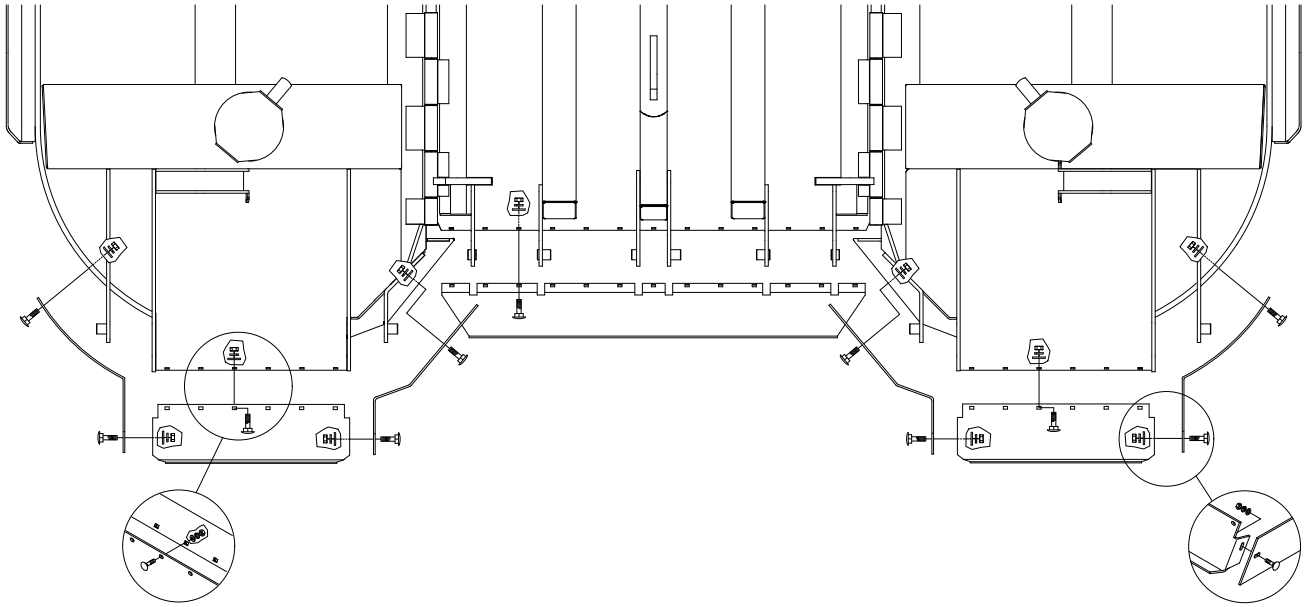


Figure 5-21 Band Installation



5-4 BAND INSTALLATION

A. **Raise wings to the transport position and install transport lock pins.** Bands will be installed to underside of deck.

B. Align holes on outer wing band with holes in wing skid. Install 3/8" x 1" bolt and nut to support band. (Figure 5-21)

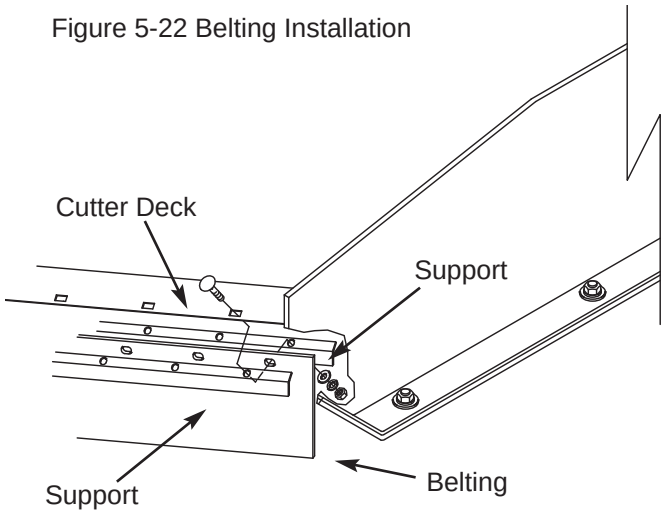
C. Align holes on bands with those on wing. Insert carriage bolts through deck and bands. Secure with lockwashers and nuts. Secure bands together using angle splice fasteners provided.

D. Tighten all nuts.

E. Align holes on center band with those on cutter center section. Insert carriage bolts through deck and bands. Secure with lockwashers and nuts.

F. Tighten all nuts.

Figure 5-22 Belting Installation



5-5 FRONT BELTING

⚠ WARNING

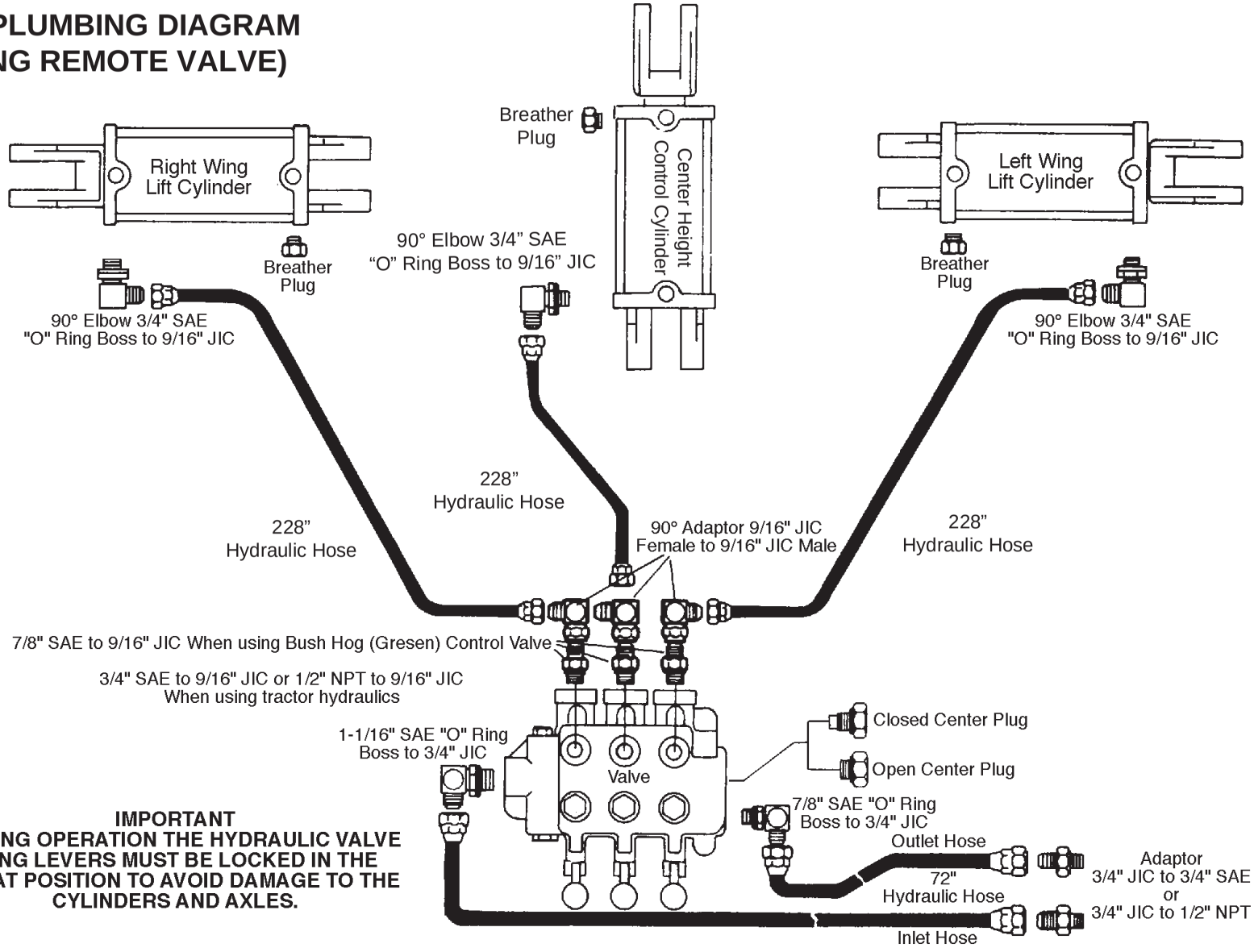
FOR NON-AGRICULTURAL USE, OSHA, ASAE, SAE AND ANSI STANDARDS REQUIRE THE USE OF CHAIN GUARDS OR OTHER PROTECTIVE GUARDS AT ALL TIMES. BUSH HOG STRONGLY RECOMMENDS THE USE OF SUCH GUARDS FOR AGRICULTURAL USES AS WELL, TO REDUCE THE RISK OF PROPERTY DAMAGE, SERIOUS BODILY INJURY, OR EVEN DEATH FROM OBJECTS THROWN OUT BY OR FROM CONTACT WITH THE CUTTING BLADES.

A. Compare each piece of belting and supports to Figure 5-20 to determine location for installation.

B. Place belting between two supports. Align holes in belt and support with those on cutter. Insert carriage bolts through deck, supports and belting. Secure with lockwashers and nuts. (Figure 5-22)

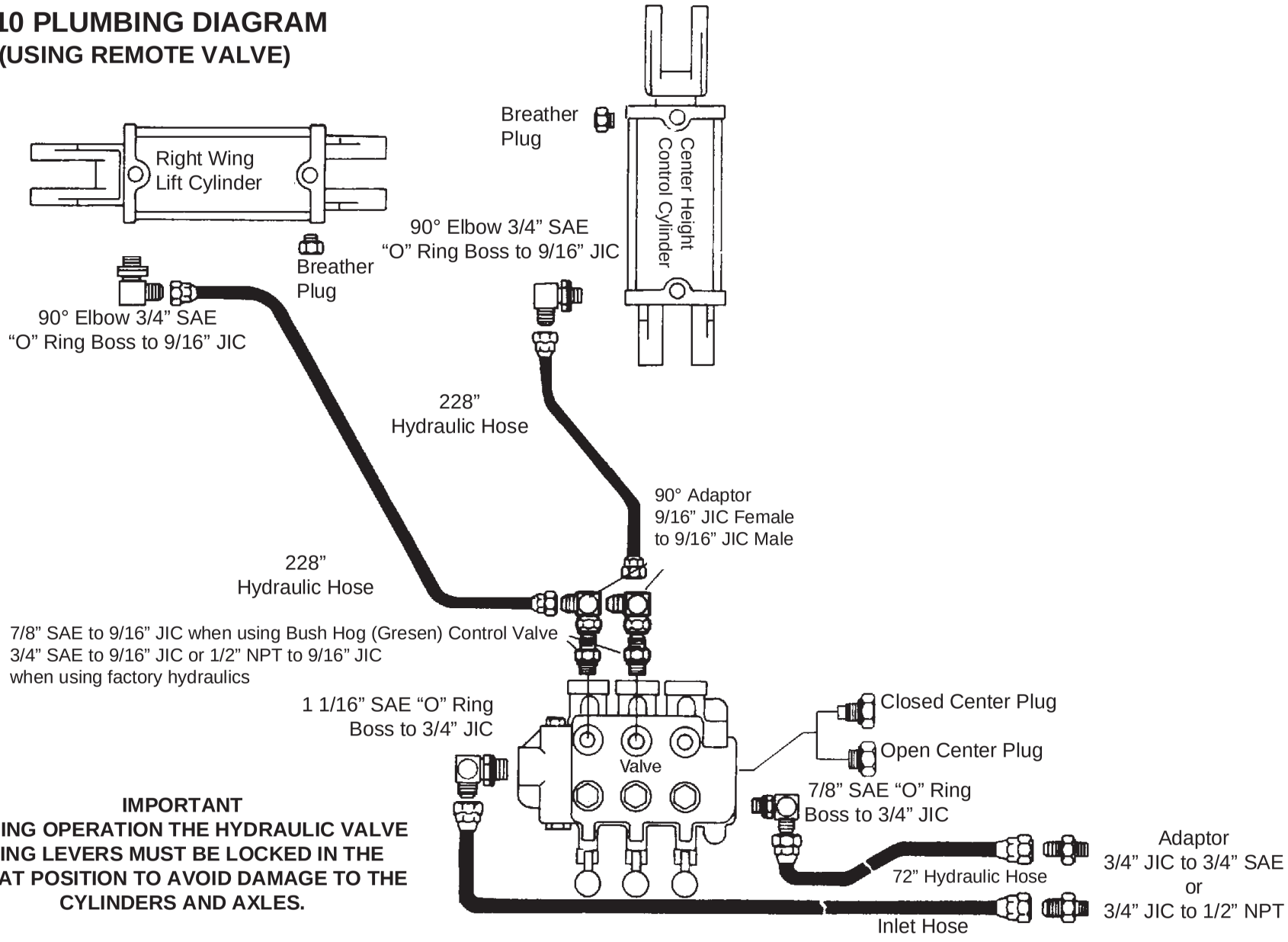
C. Tighten all nuts.

3715 PLUMBING DIAGRAM (USING REMOTE VALVE)



IMPORTANT
DURING OPERATION THE HYDRAULIC VALVE WING LEVERS MUST BE LOCKED IN THE FLOAT POSITION TO AVOID DAMAGE TO THE CYLINDERS AND AXLES.

3710 PLUMBING DIAGRAM
(USING REMOTE VALVE)



IMPORTANT
DURING OPERATION THE HYDRAULIC VALVE WING LEVERS MUST BE LOCKED IN THE FLOAT POSITION TO AVOID DAMAGE TO THE CYLINDERS AND AXLES.

SAFETY DECALS

To promote safe operation, Bush Hog supplies safety decals on all products manufactured. Because damage can occur to safety decals either through shipment, use or reconditioning, Bush Hog will, upon request, provide safety decals for any of our products in the field at no charge. Contact your authorized Bush Hog dealer for more information.

WARNING

TO AVOID SERIOUS INJURY OR DEATH:

- READ OPERATOR'S MANUAL BEFORE OPERATING AND FOLLOW ALL PRECAUTIONS. (CONTACT DEALER FOR MANUAL)
- KEEP SHIELDS AND GUARDS IN PLACE. KEEP CLEAR OF DRIVES AND BELTS.
- LOWER IMPLEMENT, STOP ENGINE AND PTO, ALLOW ALL MOVING PARTS TO STOP, AND REMOVE KEY BEFORE DISMOUNTING FROM TRACTOR.
- KNOW HOW TO STOP TRACTOR AND EQUIPMENT QUICKLY IN AN EMERGENCY.
- ALLOW NO CHILDREN OR UNQUALIFIED PERSONS TO OPERATE EQUIPMENT.
- BE CAREFUL ON UNEVEN TERRAIN. DECREASE SPEED WHEN TURNING.
- DO NOT OPERATE MOWER IN TRANSPORT POSITION.

WARNING

IMPLEMENT CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH:

- SHUT OFF TRACTOR ENGINE, REMOVE KEY, SECURE TRACTOR PARKING BRAKE AND BLOCK UP OR SECURELY SUPPORT IMPLEMENT BEFORE WORKING UNDERNEATH.
- PURGE ALL AIR FROM HYDRAULIC SYSTEM BEFORE ATTEMPTING TO RAISE OR LOWER THIS IMPLEMENT.
- STAND CLEAR IF LOWERING OR RAISING IMPLEMENT.
- DO NOT USE HAND OR SKIN TO CHECK FOR HYDRAULIC LEAKS. USE CARDBOARD OR WOOD.
- HIGH PRESSURE OIL LEAKS CAN PENETRATE SKIN CAUSING SERIOUS INJURY AND GANGRENE. CONSULT A PHYSICIAN IMMEDIATELY.
- LOWER THE IMPLEMENT AND RELEASE HYDRAULIC PRESSURE BEFORE LOOSENING FITTINGS.
- REFER TO OWNER'S MANUAL FOR DETAILS.

WARNING

TO AVOID SERIOUS INJURY OR DEATH:

- DO NOT OPERATE WITH WINGS RAISED.
- LOCK WINGS UP FOR TRANSPORT.
- STAND CLEAR IF LOWERING OR RAISING WINGS.
- DECREASE SPEED WHEN TURNING. BE CAREFUL ON SLOPES OR UNEVEN TERRAIN WITH WINGS IN RAISED POSITION.
- BE ALERT TO OVERHEAD OBSTRUCTIONS AND ELECTRICAL WIRES WITH WINGS IN RAISED POSITION.

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DANGER

KEEP AWAY - ROTATING BLADES

TO AVOID SERIOUS INJURY OR DEATH FROM BLADE CONTACT:

- LOWER IMPLEMENT, STOP ENGINE AND PTO, ALLOW ALL MOVING PARTS TO STOP, AND REMOVE KEY BEFORE DISMOUNTING FROM TRACTOR.
- ALLOW NO RIDERS ON TRACTOR OR MOWER.
- KEEP ALL PERSONS CLEAR OF OPERATING MOWER AND MOWING AREA.
- KEEP CLEAR OF ROTATING BLADES, PARTS, AND DRIVELINES.

PREVENT FALL OFF INTO ROTATING BLADES

TO PREVENT ACCIDENTAL FALL OFF FROM TRACTOR AND SERIOUS INJURY OR DEATH FROM RUN OVER OR ROLLOVER BY TRACTOR OR MOWER:

- USE ROPS (ROLLOVER PROTECTIVE STRUCTURES) AND SEAT BELT EQUIPPED TRACTORS FOR MOWING OPERATIONS.
- BUCKLE UP SEAT BELT.
- KEEP ALERT FOR STUMPS, HOLES, RUTS AND UNEVEN TERRAIN.

WARNING

ROTARY CUTTERS CAN DISCHARGE OBJECTS SEVERAL HUNDREDS OF FEET. TO AVOID SERIOUS INJURY OR DEATH TO BYSTANDERS FROM THROWN OBJECTS:

- CLEAR MOWING AREA OF VISIBLE DEBRIS AND USE EXTRA CAUTION WHERE ROCKS OR DEBRIS MAY BE PRESENT.
- DO NOT OPERATE CUTTER ALONG ROADWAYS OR IN THE VICINITY OF OTHER PERSONS WITHOUT ENCLOSED SIDES, PERMANENT BANDS, BELTING, HIGHWAY CHAINS OR OTHER FACTORY APPROVED DISCHARGE SHIELDS IN PLACE AND IN GOOD WORKING ORDER.
- KEEP ALL PERSONS WELL CLEAR OF MOWER WHEN IN OPERATION.

CAUTION

THIS IMPLEMENT IS DESIGNED TO OPERATE AT 540 RPM MAXIMUM TRACTOR PTO SPEED.

ALL DRIVE LINE SHIELDS MUST BE KEPT IN PLACE.

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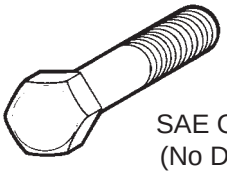
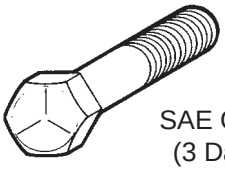
TORQUE SPECIFICATIONS

AMERICAN

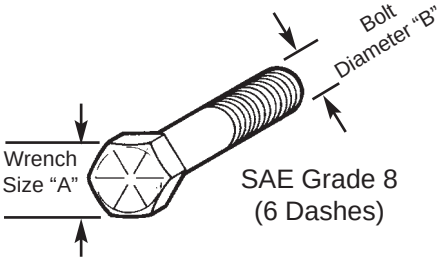
Bolt Head Markings



SAE Grade 2
(No Dashes)



SAE Grade 5
(3 Dashes)

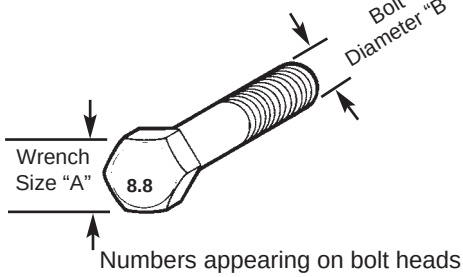


SAE Grade 8
(6 Dashes)

Proper toque for American fasteners used on Bush Hog equipment.
Recommended Torque in Foot Pounds (Newton Meters).*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 2O UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288(1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

METRIC



Numbers appearing on bolt heads indicate ASTM class.

*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.

Proper torque for metric fasteners used on Bush Hog equipment.
Recommended torque in foot pounds (newton Meters).*

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

INSTALLATION OF SPECIAL LOCKING WASHER AND GRADE 5 BOLTS ON THE MODEL 3715 / 3710 AXLE TURNBUCKLE.

Refer to the illustrations below for proper locations of each component.

NOTE: The Two Piece Locking Washer is shipped glued together to aid in assembly. If they should fall apart during transport, Figure 2 shows the proper relationship of the two halves. The washers have cams or wedges on one side that mate together.

1. Remove turnbuckles and bolts from both sides.

2. Disassemble the end of the turnbuckle with the jam nut and install a 1-1/4", two piece locking washer between the turnbuckle body and the jam nut.

3. Reassemble the turnbuckle to the approximate length it was when received. Leave loose for proper adjustment after it is installed on the cutter.

4. Follow Figure 1 for proper placement of the components when assembling the turnbuckles to the wing and center axles.

- Tighten locknuts to 644 ft. lbs +/- 50 ft. lbs.
- **After 8 hours of operation retighten to 644 ft. lbs. +/- 50 ft. lbs.**

5. Follow the instructions in the operators manual for proper turnbuckle adjustment. Once the cutter is leveled side to side using the turnbuckles, tighten the jam nut as follows to properly seat the two piece wsher.

- Torque the jam nut to 200 ft. lbs minimum against the turnbuckle body.
- Loosen and retighten the jam nut to 200 ft. lbs minimum a second time.

6. Recheck all hardware for proper torque after 8 hours running time and tighten as necessary.

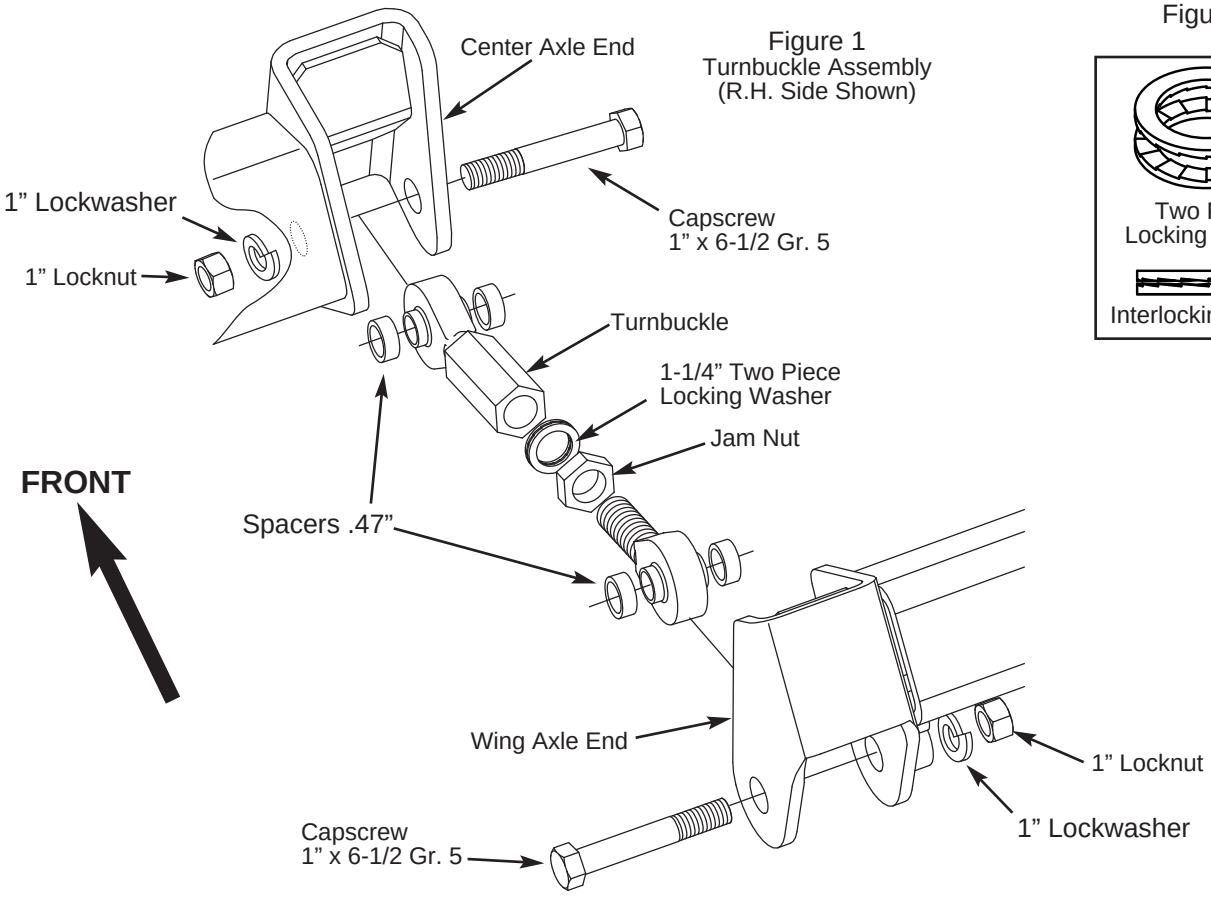


Figure 1
Turnbuckle Assembly
(R.H. Side Shown)

Figure 2

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